

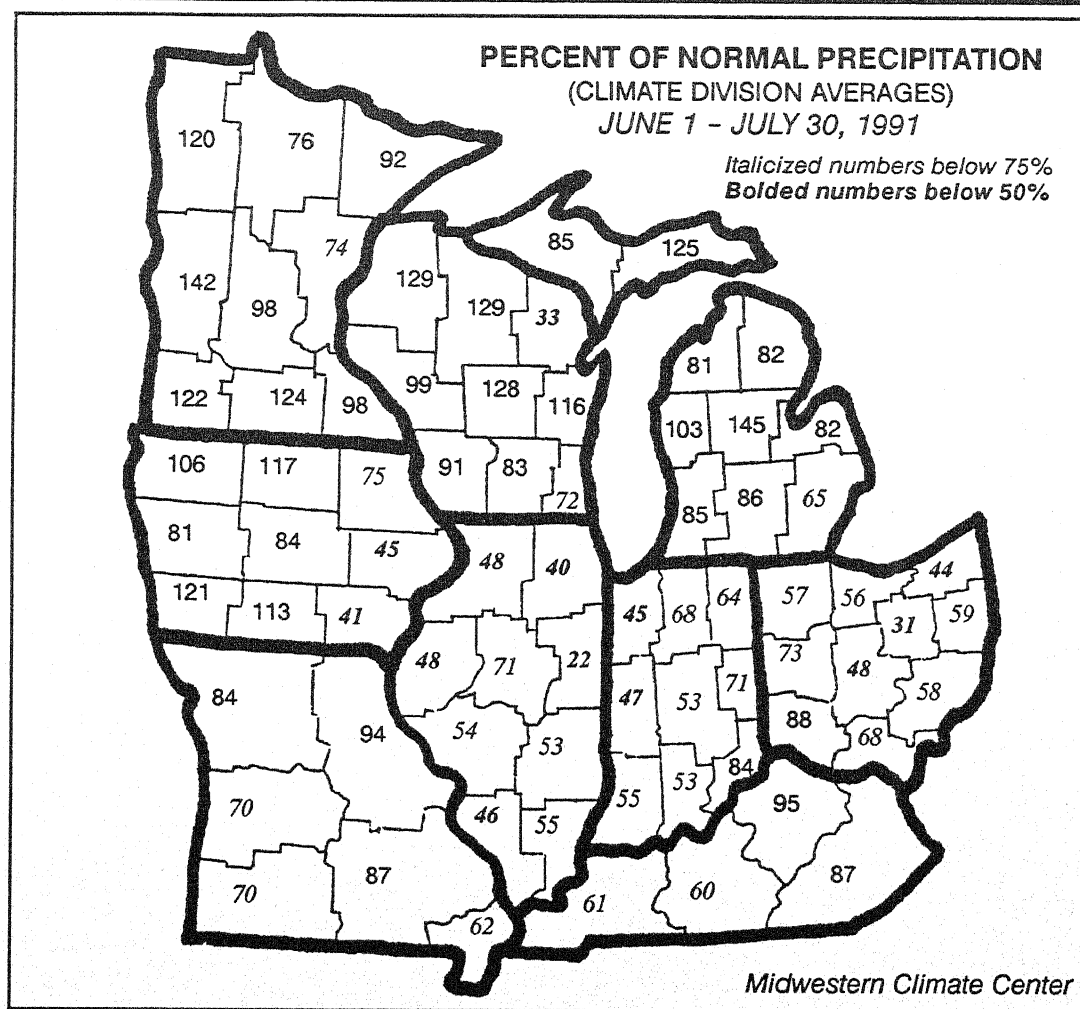
**CONTAINS:
UPDATE ON SOIL
MOISTURE
CONDITIONS IN
THE MIDWEST,
NORTHEAST, AND
MID-ATLANTIC**

WEEKLY CLIMATE BULLETIN

No. 91/30

Washington, DC

July 27, 1991



Rainfall since June 1 has been below normal across most of the Midwest. The largest shortfalls (50% of normal or less) were found through southeastern Iowa, the northern half of Illinois, northwestern and west-central Indiana, and the central and northeastern areas of Ohio. Most of the remainders of Illinois, Indiana, and Ohio received 50% to 75% of normal rainfall. Only western portions of Minnesota and Iowa, the central and northern parts of Wisconsin, and central Michigan reported above normal rainfall. Because this dry period was preceded by a very wet spring, adverse effects have primarily been limited to agriculture. However, crop losses may be substantial as many corn production analysts have lowered projections during the last 2 weeks.

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UNITED STATES DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL WEATHER SERVICE-NATIONAL METEOROLOGICAL CENTER
CLIMATE ANALYSIS CENTER



WEEKLY CLIMATE BULLETIN

This Bulletin is issued weekly by the Climate Analysis Center and is designed to indicate, in a brief concise format, current surface climatic conditions in the United States and around the world. The Bulletin contains:

- *Highlights of major climatic events and anomalies.*
- *U.S. climatic conditions for the previous week.*
- *U.S. apparent temperatures (summer) or wind chill (winter).*
- *Global two-week temperature anomalies.*
- *Global four-week precipitation anomalies.*
- *Global monthly temperature and precipitation anomalies.*
- *Global three-month precipitation anomalies (once a month).*
- *Global twelve-month precipitation anomalies (every three months).*
- *Global three-month temperature anomalies for winter and summer seasons.*
- *Special climate summaries, explanations, etc. (as appropriate).*

Most analyses contained in this Bulletin are based on preliminary, unchecked data received at the Climate Analysis Center via the Global Telecommunications System. Similar analyses based on final, checked data are likely to differ to some extent from those presented here.

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF JULY 27, 1991

Eastern United States:

COOLER CONDITIONS PREVAIL, BUT CORN BELT REMAINS PARCHED.

Temperatures averaged around 3°C above normal across south-central Pennsylvania and the northern half of Maryland, but most eastern seaboard locations recorded only slightly above normal temperatures while abnormally low readings were measured from the central Corn Belt westward [Ending after 9 weeks]. Scattered heavy showers and thunderstorms brought some localized relief from long-term dryness to portions of the mid-Atlantic and central Appalachians, but little or no rain was measured from central Ohio westward through Iowa, keeping sizable moisture deficits intact across the latter region. Totals of 10–35 mm dampened portions of eastern Ohio, western Pennsylvania, and central and northern Maryland while scattered 50–125 mm amounts soaked parts of West Virginia. In contrast, widespread heavy rains (75–200 mm) improved conditions across the southern two-thirds of Virginia, eastern Maryland, and Delaware (see Special Climate Summary for more details) [9 weeks].

2. Central and Southern Rockies and High Plains:

HEAVY MONSOONAL THUNDERSTORMS GENERATE SCATTERED FLOODING.

During three of the last four weeks, the late summer monsoon has engendered unusually heavy and widespread thunderstorms across the region. Last week, most locations measured 25–75 mm of rain, with scattered totals of 75–150 mm drenching east-central and south-central Colorado, north-central New Mexico, and southern sections of the Big Bend area in western Texas. These rains exceeded summer monthly normals at several locations, generating severe localized flooding in sections of eastern Colorado, according to press reports [4 weeks].

3. Central Mexico:

RAINFALL DECREASES SOMEWHAT.

Most areas measured 40–80 mm of rain, with isolated totals reaching 170 mm along the southwestern Gulf of Mexico coastline. Despite the smaller weekly totals, parts of central Mexico have accumulated 150–430 mm of excess rainfall since mid-June [5 weeks].

4. The Sahel:

POCKETS OF DRYNESS REMAIN.

Although most of the Sahel has measured adequate rainfall during the 1991 wet season, anomalously dry weather has affected Senegal and southwestern Mauritania, northern and western portions of Burkina Faso, and parts of east-central Sudan. Last week, generous rains (70–150 mm) ended any residual dryness across central and southern Senegal, but the remainders of the aforementioned regions recorded only 10–20 mm of rain, except for scattered 20–50 mm amounts across Burkina Faso [6 weeks].

5. Central and Northwestern India, the Punjab, and Azad:

WIDESPREAD HEAVY RAINS BRING RELIEF TO CENTRAL INDIA.

Soaking rains (100–300 mm) deluged eastern Gujarat, eastern Rajasthan, and Madhya Pradesh, significantly easing four to six weeks of abnormally dry weather across the region. Moisture deficits continued, however, farther north and west. The southwestern tier of Uttar Pradesh recorded only 40–80 mm of rain while 20–40 mm moistened western Gujarat, central Rajasthan, Indian and northern Pakistani Punjab, Haryana, western Kashmir, and Azad [8 weeks].

6. Eastern Siberia:

SEASONABLE TEMPERATURES PREVAIL.

Temperatures averaged only 1°C or 2°C above normal, bringing an end to the mild spell [Ended after 6 weeks].

7. The Yangtze River Valley, Southern Heilungjiang, and the Koreans:

DRIER ACROSS YANGTZE RIVER VALLEY, BUT CONTINUED WET ELSEWHERE.

The Yangtze River Valley experienced a second consecutive week of little or no rainfall, bringing an end to the exceptionally wet weather that prevailed earlier in the summer. Farther northeast, however, exceptionally heavy rainfall was again measured. Totals of 100–250 mm inundated the northern three-quarters of the Korean peninsula while scattered 80–200 mm amounts soaked southern Heilungjiang. Since mid-June, 55–100 mm of excess rainfall has accumulated across the latter region while isolated departures reaching 220 mm were reported across the Koreans [8 weeks].

8. Southeastern China and Western Taiwan:

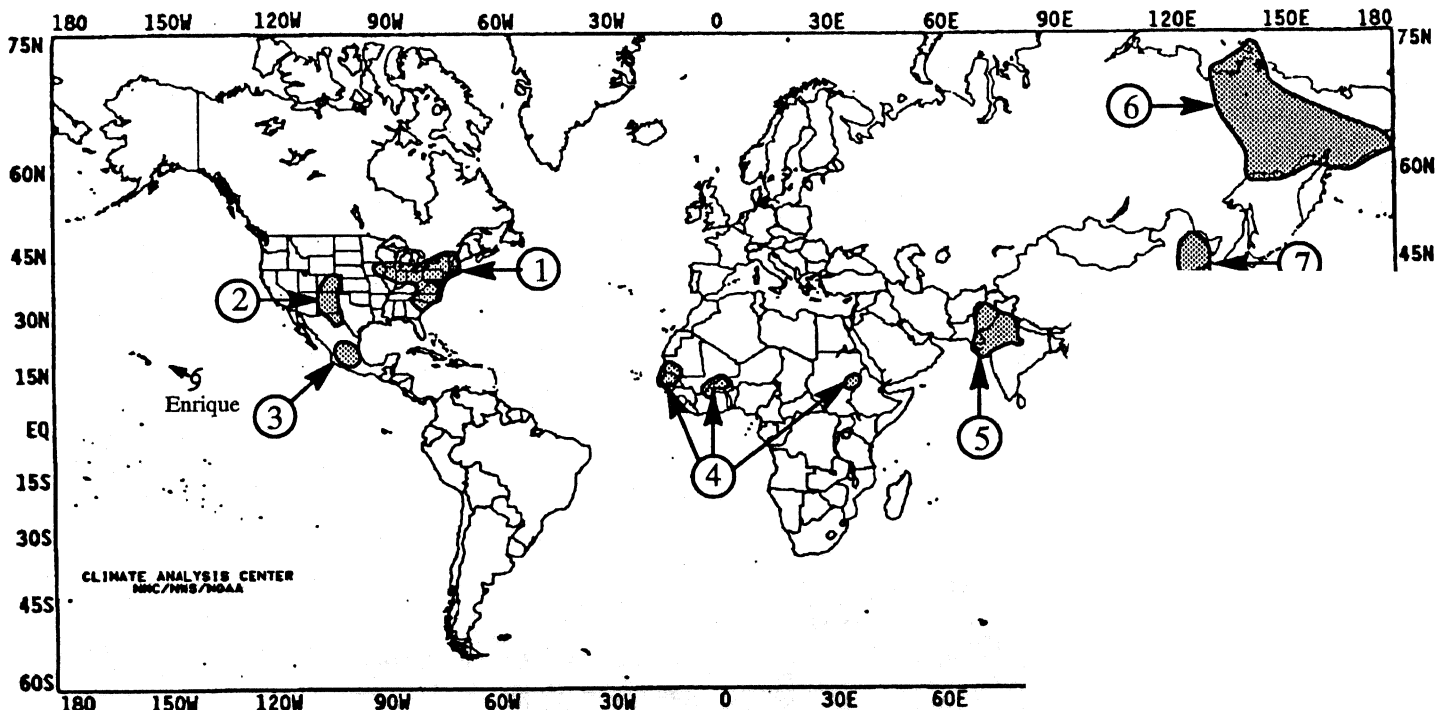
ANOTHER DRY SPELL AFFLICTS REGION.

Long-term rainfall shortages have plagued the region, particularly Taiwan, for nearly a year. Meanwhile, large short-term deficits have sporadically developed across the region during the period and have re-developed during the last four weeks. Most locations have measured 80–125 mm below normal rainfall since late June, with isolated areas recording shortfalls as large as 340 mm. Many locations have measured little or no rainfall during July [4 weeks].

9. Luzon:

TYPHOON BRENDAN COMBINES WITH PERSISTENT TROPICAL SHOWERS TO DELUGE THE ISLAND.

Minimal Typhoon Brendan trekked across the northeastern corner of Luzon early in the week, generating daily rainfall amounts up to 185 mm and wind gusts as high as 145 kph. As the week progressed, tropical rainshowers continued to batter the island, bringing weekly amounts of 80–200 mm, with isolated totals up to 645 mm, to most of the island. According to press reports, resultant mudslides and river flooding left nearly 100,000 individuals homeless and took over a dozen lives. Nearly 215 mm of rain fell within 24 hours in Manila on Friday and Saturday [Episodic Event].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperatures recorded only slightly above normal temperatures while abnormally low readings were measured from the central Corn Belt westward [Ending after 9 weeks].

MAP: Approximate locations of major anomalies and episodic events are shown. See other maps for temperature anomalies, four week precipitation anomalies, long-term anomalies, and other

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF JULY 21 – 27, 1991

Intense heat and high humidity combined to produce oppressive conditions across the nation east of the Rockies. Readings exceeded 100°F across parts of the central Plains, Midwest, mid-Atlantic and Northeast, producing over two dozen record daily highs from Illinois to Connecticut. Hartford, CT observed a record third consecutive day above the century mark when the mercury hit 101°F on Sunday. Meanwhile, the high of 102°F at Providence, RI on Sunday was a record for the day, the month of July, and the second highest reading since records began. High humidity in conjunction with the heat created dangerous apparent temperatures in the mid-Atlantic and central Plains. Strong thunderstorms erupted across a large portion of the country, providing some short-lived relief from the heat. However, brief and heavy rains flooded roads and bridges, caused mud-slides, and pushed rivers and streams out of their banks from portions of the southern Plains to the mid-Atlantic. Nearly two dozen tornadoes touched down from the central Rockies to northern New England. Thunderstorms were not confined to the contiguous United States, however. On Wednesday, Juneau, AK reported a thunderstorm an event that usually only occurs once every two or three years during the summer months. Meanwhile, some areas failed to receive much needed rain. A drought emergency was declared this week in parts of Pennsylvania. According to press reports, water restrictions were implemented in thirty-nine counties in central Pennsylvania which is currently suffering through the worst drought in 60 years. Several streams are reportedly flowing at levels as much as 70% below normal. Elsewhere, unseasonably cool weather settled across parts of the Rockies, northern Plains, upper Midwest, Great Lakes, and Northeast. Numerous record daily lows were established from New Mexico to Michigan with readings dipping into the thirties in Colorado.

The week began with hot and muggy weather from the central Plains to southern New England. Numerous record daily highs were established as readings soared above 100°F. Danbury, CT hit 103°F on Sunday marking the fifth consecutive day with highs above 100°F. High humidity along with the heat pushed apparent temperatures near 110°F at some locations in the mid-Atlantic. Farther west, blazing heat baked the central Plains. Salina, KS recorded a high of 109°F on Monday. Meanwhile, strong thunderstorms erupted along a cold front that trekked across the northern Plains and upper Midwest. Heavy rain, hail, and damaging winds raked the northern Plains, upper Midwest, and Great Lakes. Elsewhere, severe weather erupted in the muggy air mass across the southern U.S. Storms drenched parts of the middle Mississippi Valley, leaving up to six feet of water on roads in Stockton, MO. Thunderstorms also soaked portions of the southern Rockies as tropical moisture surged northward from the Gulf of Mexico. By Tuesday, the cold front in the northern Plains had pushed eastward into the Ohio Valley with the trailing edge stalled across the southern Plains. Severe weather continued to erupt along the frontal system as it moved rapidly to the east. The northern extent of the front eventually pushed off the north Atlantic coast while the remainder stalled in the mid-Atlantic westward to the southern Plains. Much cooler air put an end to the heat wave across northern New England and the central Plains. Highs across the central Plains were nearly twenty degrees cooler on Wednesday. Meanwhile, hot and humid weather continued across the mid-Atlantic and southern New England nearly a dozen record highs

were reported from South Carolina to New Jersey on Tuesday. Hot weather also affected the Far West where daily record highs were established in Washington and Oregon.

During the last half of the week, severe thunderstorms erupted along the stalled frontal system stretching from the mid-Atlantic to the southern Plains. Heavy rains, hail, and strong wind gusts battered several states. Flooded roads and bridges, and downed trees and power lines were reported from Texas to Virginia. One storm dumped over 5.5 inches of rain in four hours on Arlington, VA. Up to 4 inches of rain in one hour in North Carolina caused mud-slides and flash flooding and forced the evacuation of a campground in Avery County. In Florida, strong wind gusts accompanying thunderstorms damaged 3 light aircraft, flipping one and damaging a hangar housing two others. Meanwhile, unseasonably cool air pushed southward into the central Rockies, the northern half of the Great Plains, the Midwest, Ohio Valley, Great Lakes, and Northeast. Record lows were reported across much of the upper Midwest as readings dipped to 40°F at Duluth, MN. At week's end, warm and muggy conditions were confined to the deep South while cool conditions reached from the southern Rockies to the Great Lakes with half a dozen record lows reported on Saturday morning. Thunderstorms continued to dump heavy rains on parts of the southern Plains and mid-Atlantic. Over 4 inches of rain soaked Comanche, OK on Saturday.

According to the River Forecast Centers, the greatest weekly totals (more than 2 inches) fell on the central and southern Rockies, much of the central and southern Plains, the deep South, southern Appalachians, the mid-Atlantic, the eastern half of New England, scattered locations in the Great Lakes, upper Midwest, Northwest, and southern Alaska (Table 1). Moderate to heavy amounts fell across the remainders of New England, the Great Lakes, upper Midwest, the Appalachians, the central and southern Plains, and central Rockies, the eastern portions of the Ohio Valley and Dakotas, parts of the northern Rockies, Hawaii, and most of southern Alaska. Little or no precipitation was measured in the remainders of the Ohio Valley, Great Plains, Rockies, and across most of northern and central Alaska and a few locations in southwestern Alaska.

Hot weather persisted across the eastern quarter of the nation and the Pacific Northwest (Table 2). Readings exceeding 100°F were felt in the mid-Atlantic, southern New England, and southern Washington. Weekly departures between +4°F and +6°F were observed from South Carolina to Maine. Departures of +2°F to +4°F were common from the Tennessee Valley to western New England and across most of the Pacific Northwest. In Alaska, unusually mild conditions engulfed much of the state. Weekly departures up to +5°F were reported at Nome, AK where temperatures reached into the seventies.

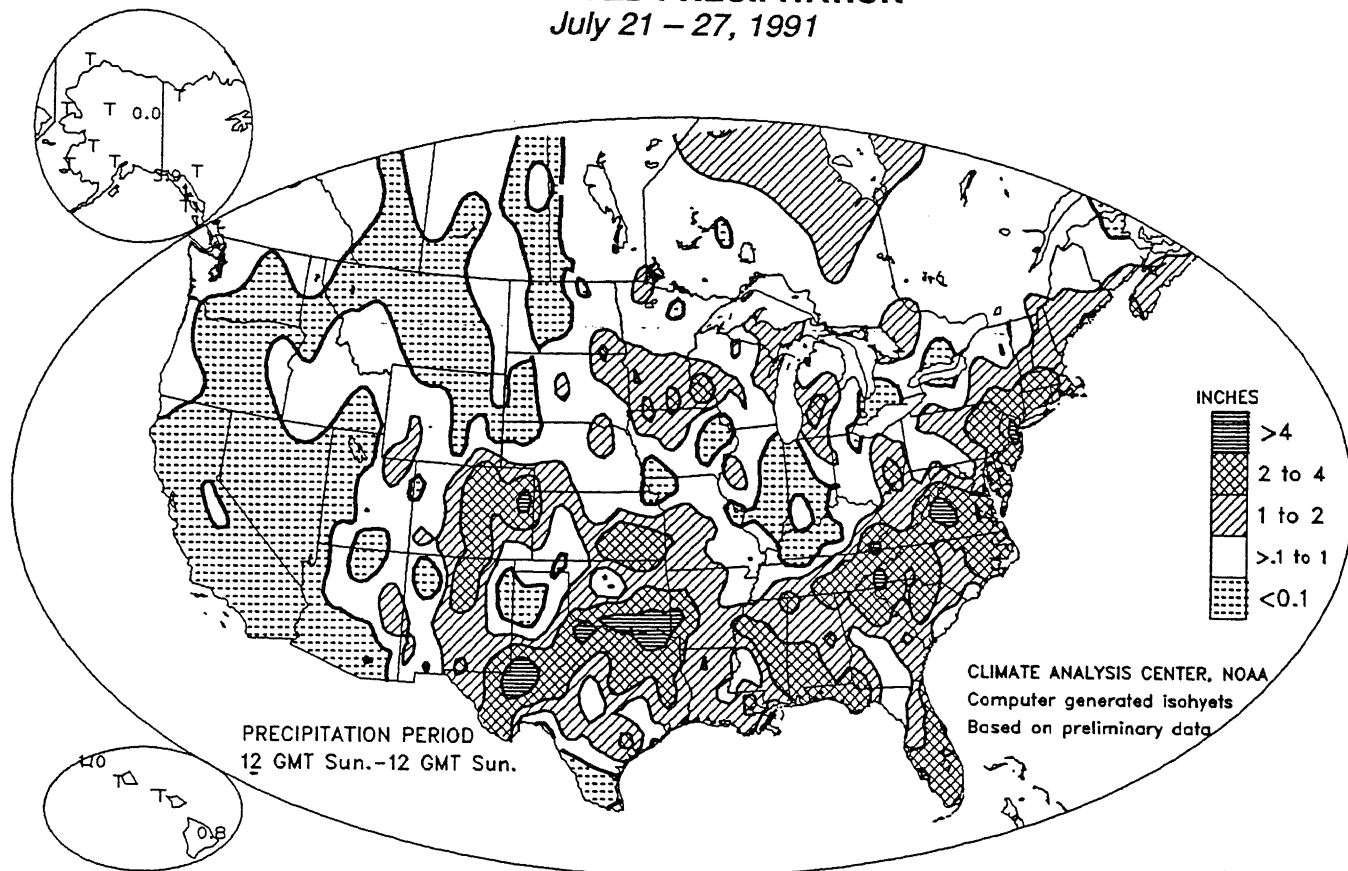
Meanwhile, unseasonably cool weather dominated a large portion of the conterminous U.S. (Table 3). Departures of -5°F to -9°F were prevalent across the central and southern Rockies, northern Plains, and parts of the Southwest. Despite searing heat early in the week, temperatures averaged 2°F to 4°F below normal across the central Plains. Unseasonably cool conditions were confined to only a few locations in extreme northern and southern Alaska with weekly departures to -3°F observed at Barrow, AK.

TABLE 1. SELECTED STATIONS WITH 2.75 OR MORE INCHES OF PRECIPITATION DURING THE WEEK OF JULY 21 – 27, 1991

<u>STATION</u>	<u>TOTAL</u> <u>(INCHES)</u>	<u>STATION</u>	<u>TOTAL</u> <u>(INCHES)</u>
MIDLAND, TX	6.62	VICTORIA, TX	3.36
FORT MYERS, FL	5.36	CAPE HATTERAS, NC	3.26
GOLDSBORO/SEYMOUR-JOHNSON AFB, NC	4.95	MARFA, TX	3.24
WINK, TX	4.64	MILLVILLE, NJ	3.15
CRESTVIEW, FL	4.36	NEW ORLEANS/MOISANT, LA	3.04
COLUMBIA, SC	4.33	VIRGINIA BEACH OCEANA NAS, VA	3.01
HAMPTON/LANGLEY AFB, VA	4.18	GRAND RAPIDS, MI	3.00
YAKUTAT, AK	3.91	JACKSONVILLE/NEW RIVER MCAS, NC	2.89
LUFKIN, TX	3.70	DOVER AFB, DE	2.89
ROANOKE, VA	3.51	PENSACOLA, FL	2.81
NEWARK, NJ	3.47	DENVER, CO	2.78
MOBILE, AL	3.40	ASHEVILLE, NC	2.77
DOTHAN, AL	3.39		

OBSERVED PRECIPITATION

July 21 - 27, 1991



DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

July 21 - 27, 1991

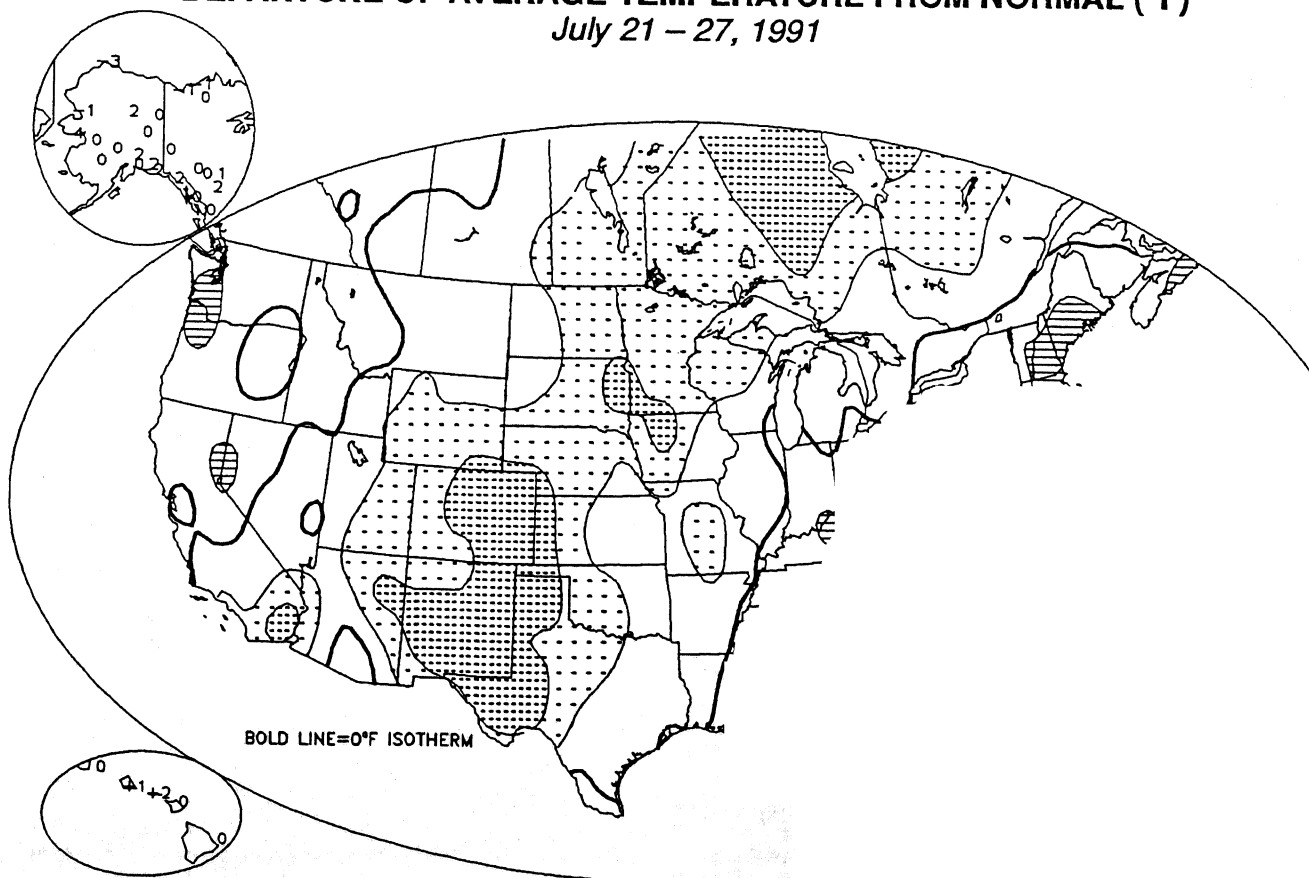


TABLE 2. SELECTED STATIONS WITH TEMPERATURES AVERAGING 4.5°F OR MORE ABOVE NORMAL FOR THE WEEK OF JULY 21 - 27, 1991

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
NORFOLK, VA	+6.6	85.6	PHILADELPHIA, PA	+4.9	82.1
MARTINSBURG, WV	+6.5	82.1	ATLANTIC CITY, NJ	+4.9	80.1
HARRISBURG, PA	+6.3	82.4	AUGUSTA, ME	+4.9	74.9
ISLIP, NY	+5.9	79.1	RALEIGH-DURHAM, NC	+4.8	83.1
NEW BERN, NC	+5.5	85.2	BALTIMORE-WASHINGTON INTL, MD	+4.8	82.1
ALTOONA, PA	+5.5	76.7	COLUMBUS, OH	+4.8	79.1
DULLES AIRPORT, VA	+5.3	81.0	MORGANTOWN, WV	+4.8	78.2
WILLIAMSPORT/LYCOMI, PA	+5.3	78.3	BECKLEY, WV	+4.8	74.7
CHARLESTON, WV	+5.2	80.0	GOLDSBORO/JOHNSON AFB, NC	+4.7	84.8
PORTLAND, ME	+5.2	74.1	NEW YORK/KENNEDY INTL, NY	+4.7	80.4
CHARLOTTE, NC	+5.1	84.2	NOME, AK	+4.7	56.0
PITTSBURGH, PA	+5.1	77.6	BANGOR, ME	+4.5	73.0
ZANESVILLE, OH	+5.0	77.9	RUMFORD, ME	+4.5	72.1
ELKINS, WV	+5.0	75.0			

TABLE 3. SELECTED STATIONS WITH TEMPERATURES AVERAGING 5.75°F OR MORE BELOW NORMAL FOR THE WEEK OF JULY 21 - 27, 1991

STATION	DEPARTURE (°F)	AVERAGE (°F)	STATION	DEPARTURE (°F)	AVERAGE (°F)
TUCUMCARI, NM	-9.0	70.4	DALHART, TX	-6.7	71.1
REDMOND, OR	-8.6	58.4	BLYTHE, CA	-6.7	89.1
LA JUNTA, CO	-8.5	71.0	LARAMIE, WY	-6.6	58.5
COLORADO SPRINGS, CO	-8.0	63.6	WINK, TX	-6.6	76.9
PUEBLO, CO	-7.7	69.7	THERMAL, CA	-6.6	86.1
DENVER, CO	-7.2	66.9	ALBUQUERQUE, NM	-6.5	72.6
AKRON, CO	-7.2	67.1	ELKHART, KS	-6.5	73.0
TRUTH OR CONSEQUENCES, NM	-7.2	72.0	GOODLAND, KS	-6.3	70.2
WATERTOWN, SD	-7.1	64.7	AMARILLO, TX	-6.2	72.9
WINSLOW, AZ	-7.1	72.0	MIDLAND, TX	-6.2	75.7
FORT COLLINS, CO	-7.0	65.0	CARLSBAD, NM	-6.2	76.4
TRINIDAD, CO	-7.0	67.3	SIOUX FALLS, SD	-5.8	68.7



FIGURE 1. Total Precipitation Across the South-Central United States, July 21-27, 1991. *Isopleths only drawn for 0, 1, 2, 4, and 6 inches. Needed rain soaked a large portion of the central and southern Plains and middle Mississippi Valley this past week. As much as a half a foot drenched locations in Texas, Oklahoma, and Arkansas while heavy rains caused localized flooding in eastern Colorado and northern New Mexico.*

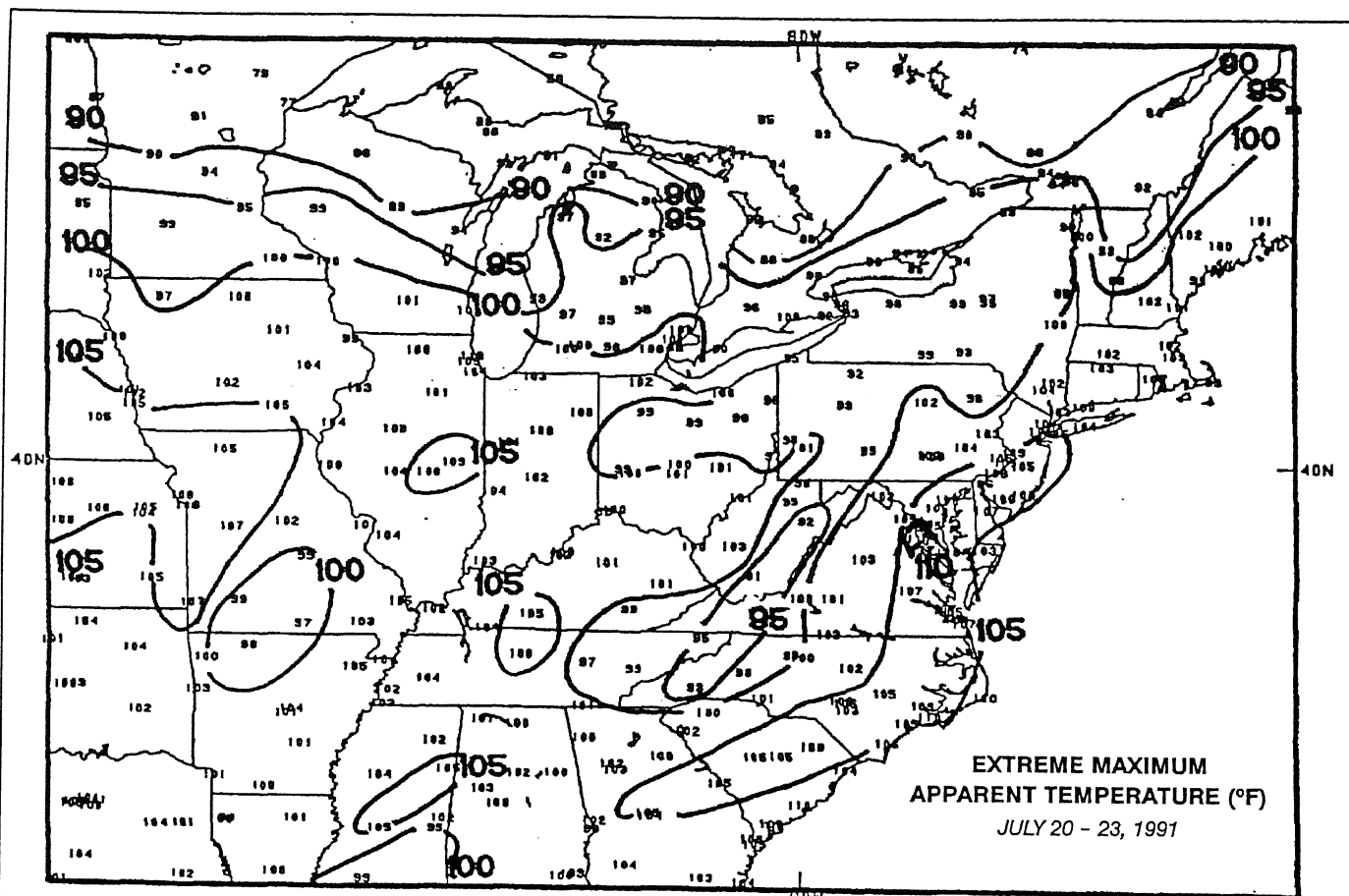
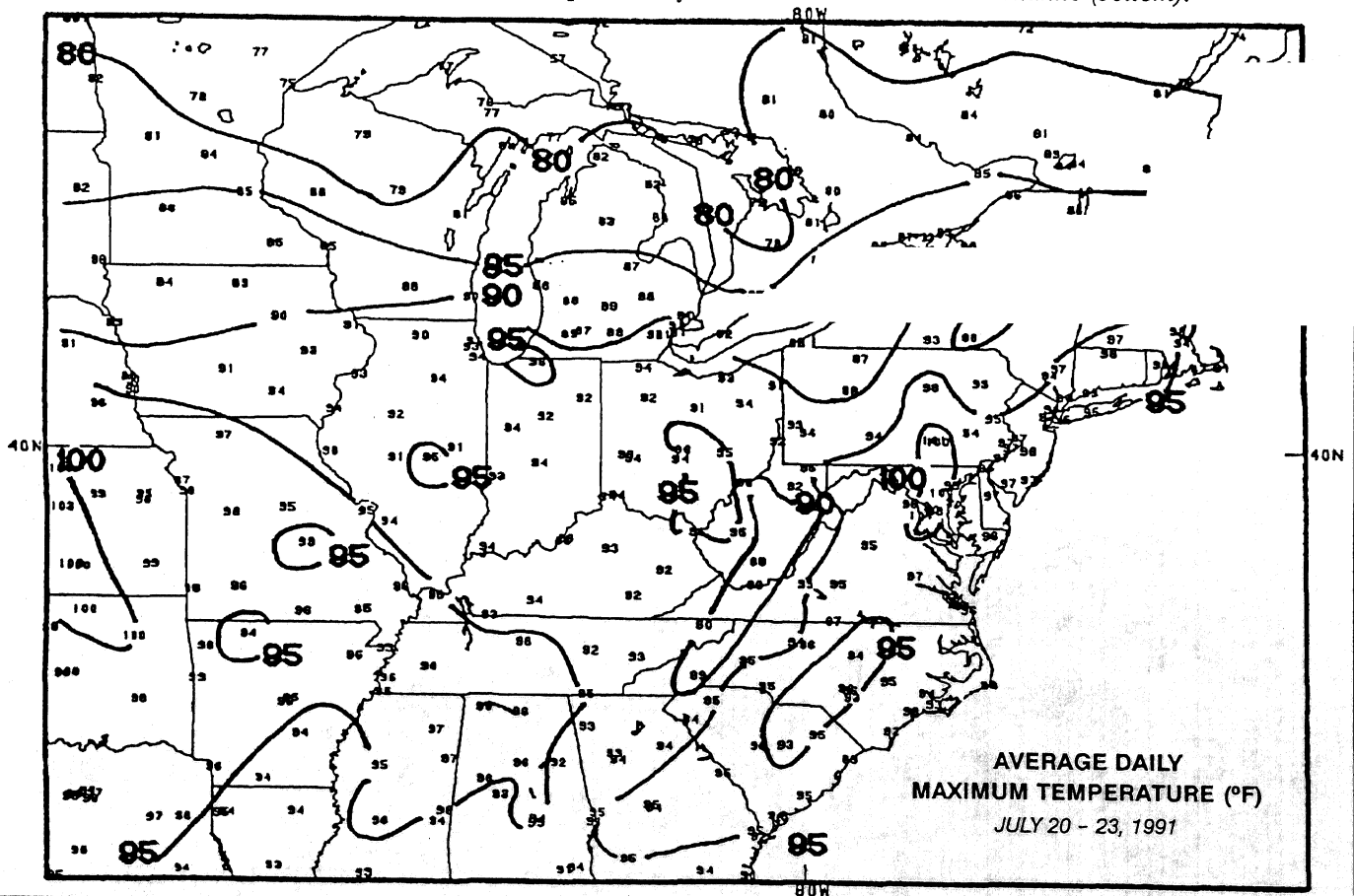
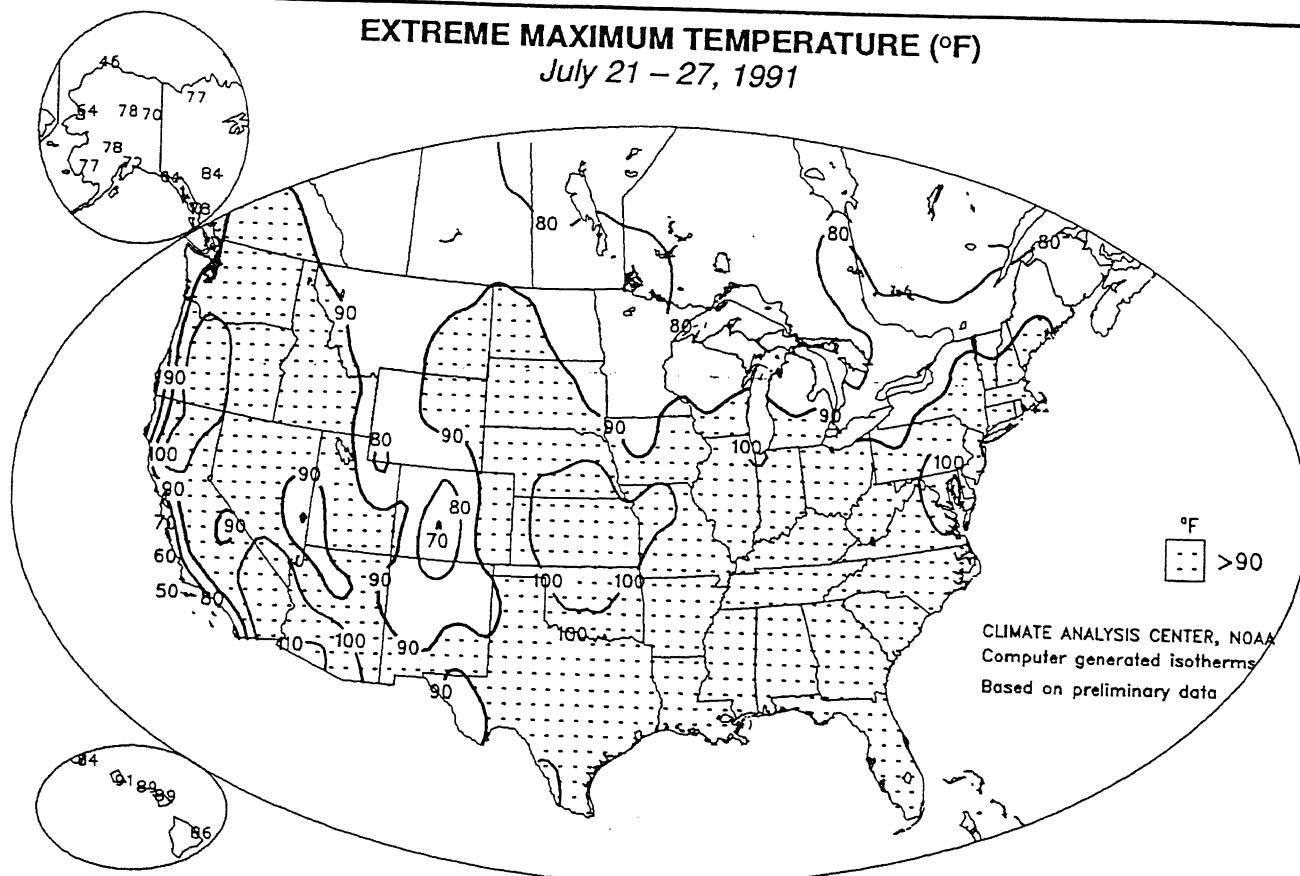


FIGURE 2. Much of the eastern-half of the nation sweltered from a mid-summer heat wave during the four day period July 20-23. The heat combined with high humidity to produce dangerous apparent temperatures exceeding 105°F in the central Plains, middle Mississippi Valley, and along the southern and middle Atlantic seaboard (top). Maximum temperatures averaged more than 100°F across portions of the central Plains and mid-Atlantic (bottom).



EXTREME MAXIMUM TEMPERATURE (°F)

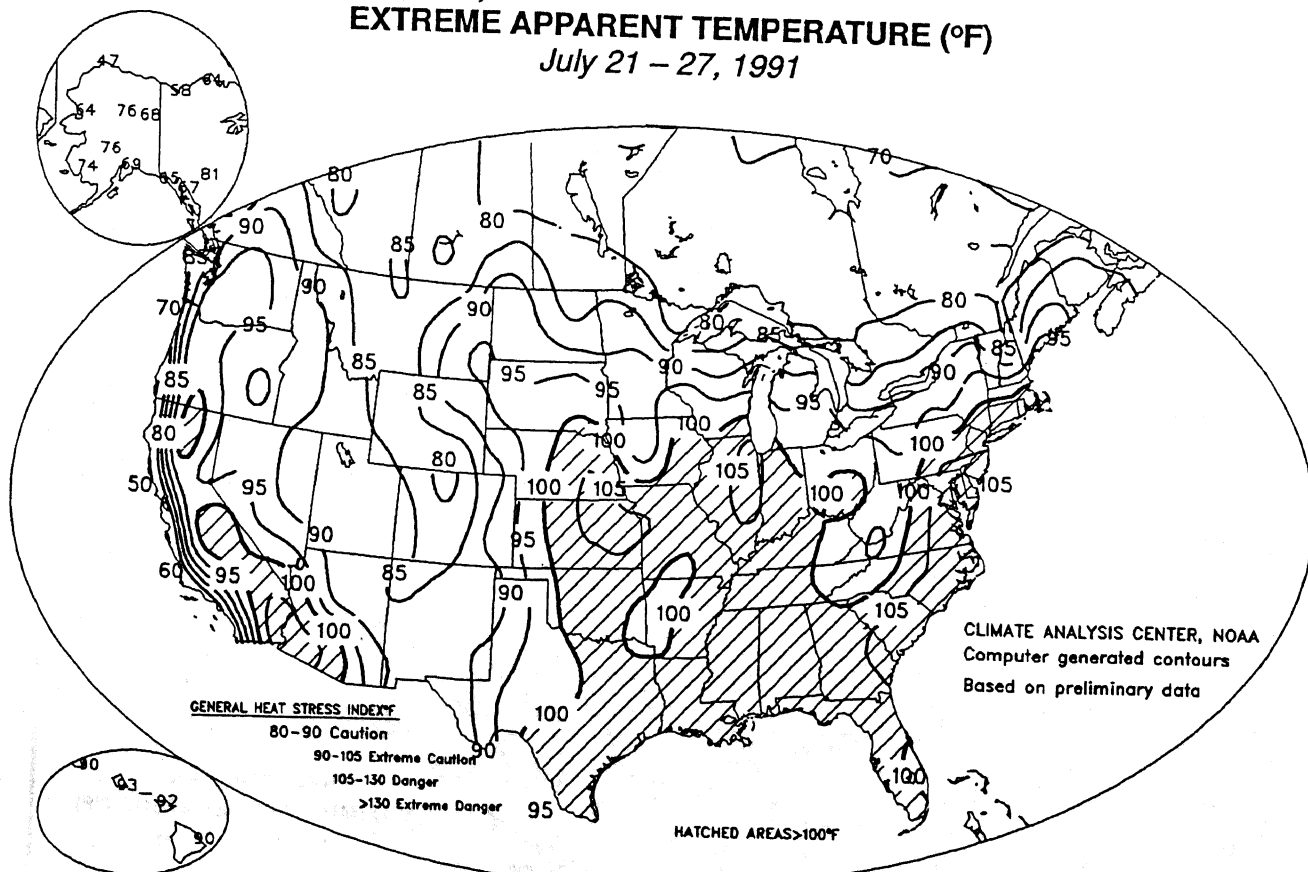
July 21 - 27, 1991



It was another hot week for much of the nation as temperatures soared above the century mark in portions of the Far West, desert Southwest, central and southern Plains, Great Lakes Region, and mid-Atlantic (top). In the eastern-half of the nation, the hot weather was exacerbated by high humidity via the Gulf of Mexico, as apparent temperatures reached 105°F and above in the Midwest, central Plains, and along the Atlantic Seaboard (bottom).

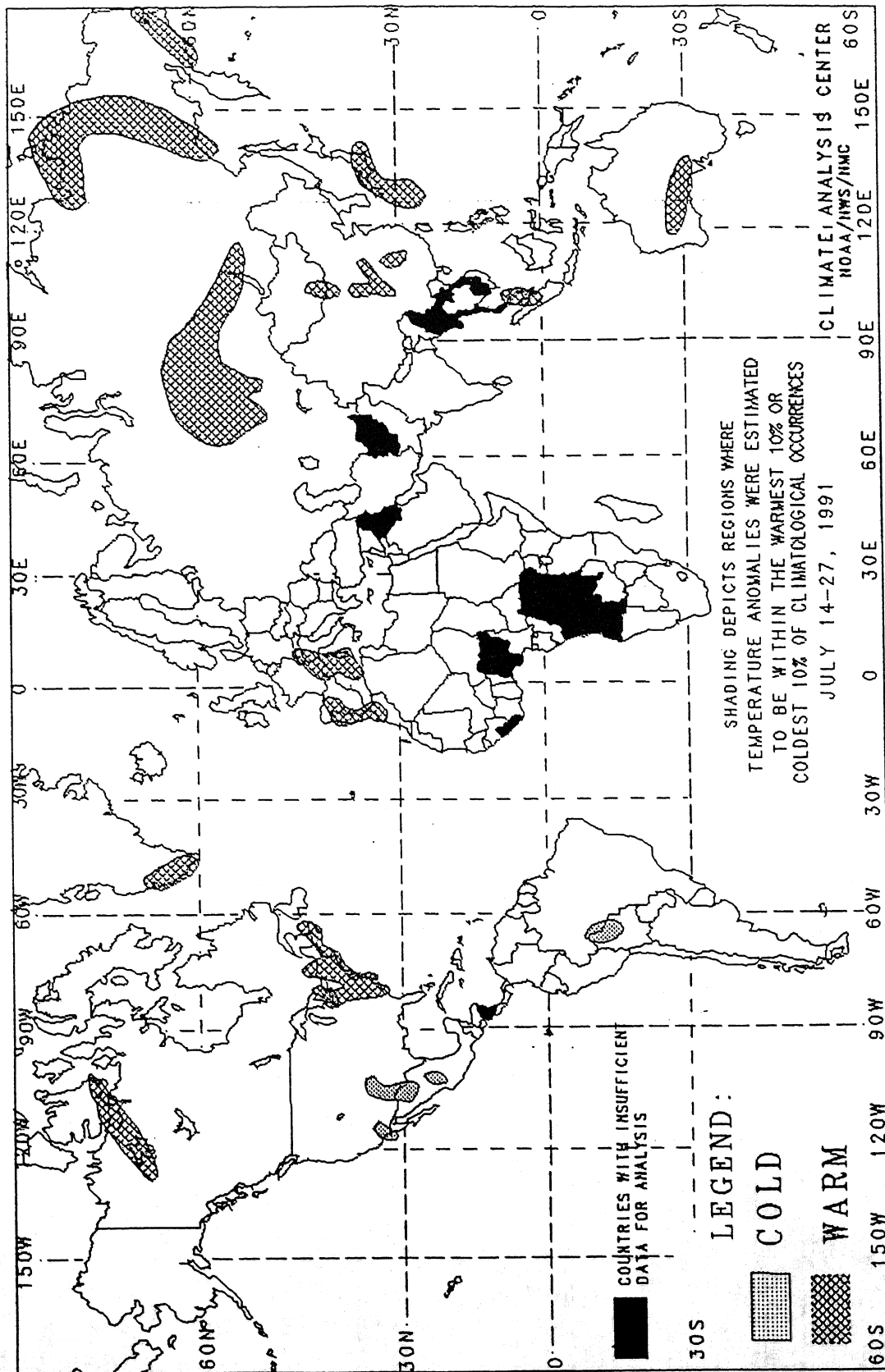
EXTREME APPARENT TEMPERATURE (°F)

July 21 - 27, 1991



2-WEEK GLOBAL TEMPERATURE ANOMALIES

JULY 14 - 27, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 13 days of temperature observations were received from synoptic reports. Many stations do not operate on a twenty-four hour basis so many night time observations are not taken. As a result of these missing observations the estimated minimum temperature may have a warm bias. This in turn may have resulted in an overestimation of the extent of some warm anomalies.

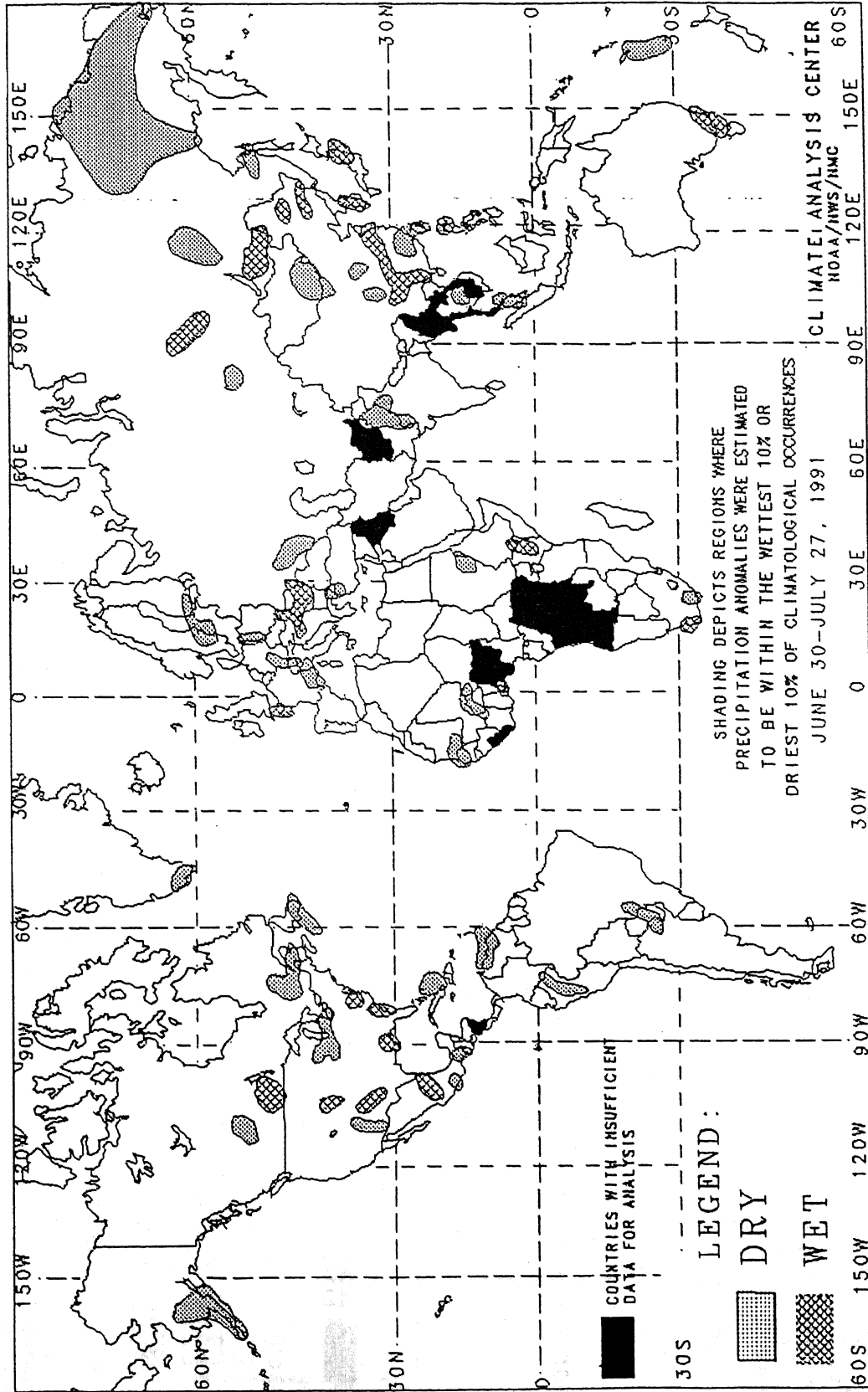
Temperature anomalies are not depicted unless the magnitude of temperature departures from normal exceeds 1.5°C.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

This chart shows general areas of two week temperature anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

4-WEEK GLOBAL PRECIPITATION ANOMALIES

JUNE 30 - JULY 27, 1991



The anomalies on this chart are based on approximately 2500 observing stations for which at least 27 days of precipitation observations (including zero amounts) were received or estimated from synoptic reports. As a result of both missing observations and the use of estimates from synoptic reports (which are conservative), a dry bias in the total precipitation amount may exist for some stations used in this analysis. This in turn may have resulted in an overestimation of the extent of some dry anomalies.

In climatologically arid regions where normal precipitation for the four week period is less than 20 mm, dry anomalies are not depicted. Additionally, wet anomalies for such arid regions are not depicted unless the total four week precipitation exceeds 50 mm.

In some regions, insufficient data exist to determine the magnitude of anomalies. These regions are located in parts of tropical Africa, southwestern Asia, interior equatorial South America, and along the Arctic Coast. Either current data are too sparse or incomplete for analysis, or historical data are insufficient for determining percentiles, or both. No attempt has been made to estimate the magnitude of anomalies in such regions.

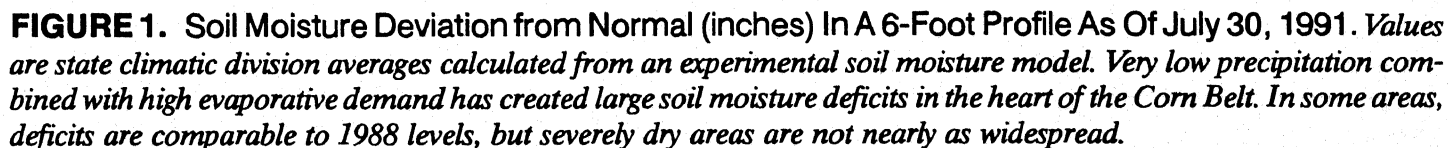
The chart shows general areas of four week precipitation anomalies. Caution must be used in relating it to local conditions, especially in mountainous regions.

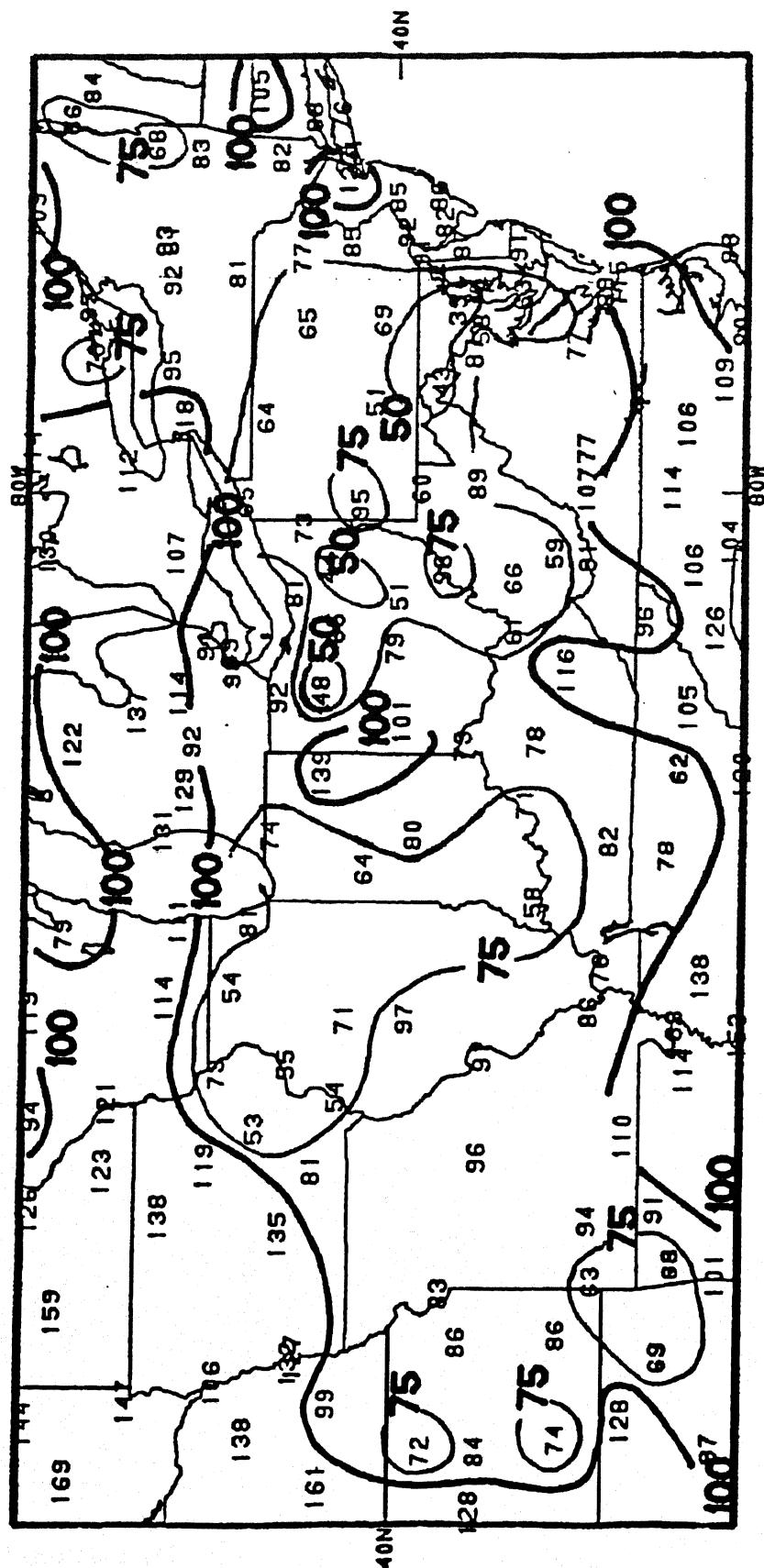
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Dry conditions began over the mid-Atlantic in early April. May and June marked a continuation of these abnormally dry conditions, which spread throughout most of the northeastern states. Scattered thunderstorms have brought temporary relief to some parts of the region since early July, but not in sufficient quantity to have much of an impact on long-term rainfall deficits (Figure 2). The dry weather has been aggravated by above normal temperatures. June was the ninth consecutive month with above normal temperatures for most northeastern and mid-Atlantic states while mid-July brought several days of record-breaking heat. Bridgehampton, Long Island, for instance, reported their highest temperature on record when the mercury soared to 102°F.

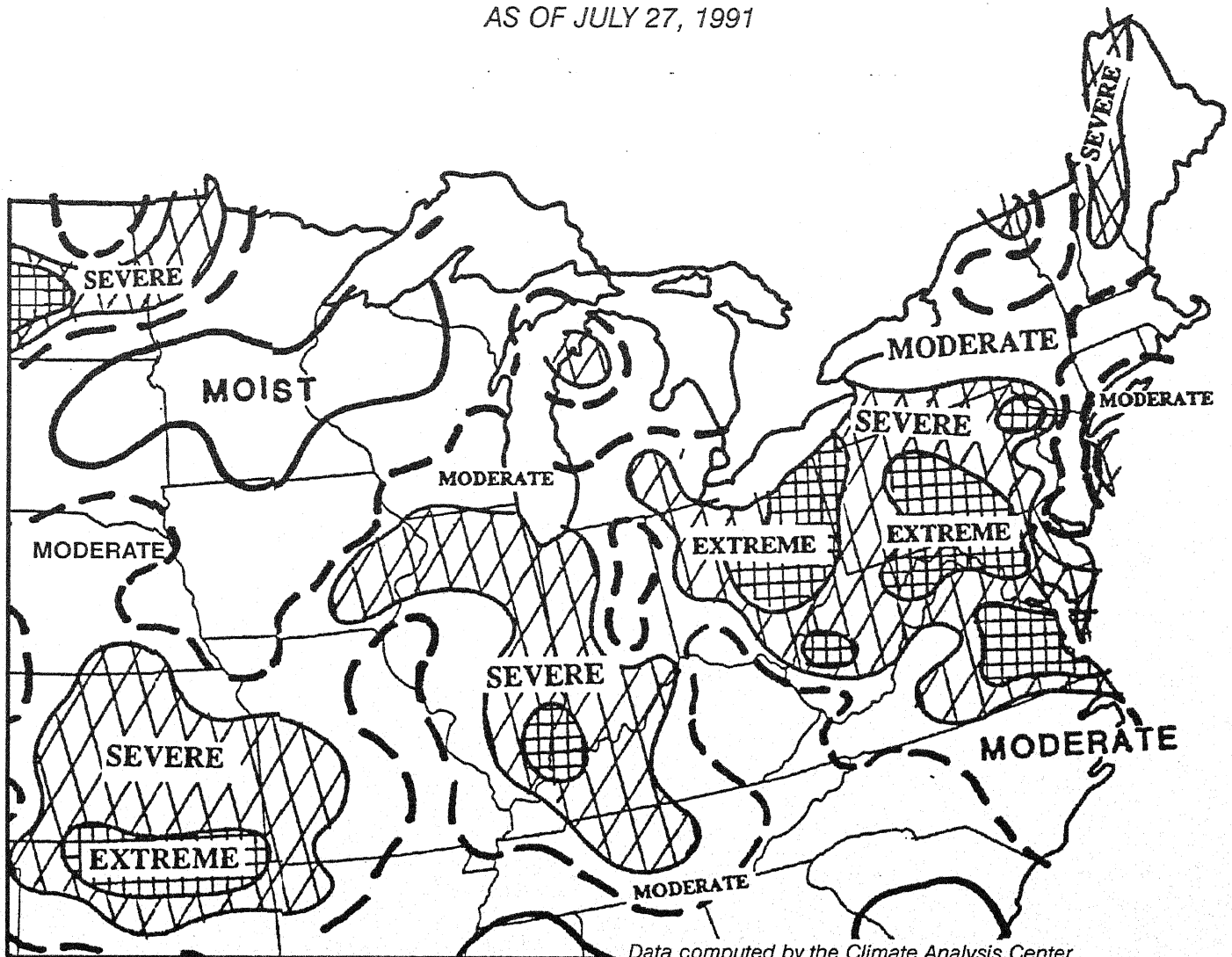
conditions extending from Ohio eastward through Pennsylvania, Maryland, and Virginia, as well as parts of the central and southern Plains and middle Mississippi Valley (Figure 3). The prolonged spell of hot and dry weather has taken a toll on the water supply in Pennsylvania, where the state government issued a "drought warning" for the Susquehanna and Potomac river basins. This declaration called for voluntary water usage curtailment by 10 to 15 percent. During June, the West Branch of the Susquehanna River at Williamsport dropped to its lowest flow level in more than 90 years. Mandatory water restrictions were also in effect in the Norfolk, VA area.

The heat and dryness has also had a pronounced impact on agriculture in the Northeast and mid-Atlantic. Because the warm and dry spring provided very good planting conditions, most crops are developing one to three weeks ahead of normal. As the dryness extended into June and July, however, most crops began to suffer. In late July, crop losses due to the drought were estimated at \$57 million in Maryland and \$278 million in Pennsylvania, where Governor Casey asked that a federal drought disaster declaration be issued for 27 counties scattered around the state (according to reports from the Northeast Regional Climate Center).





PALMER DROUGHT SEVERITY INDEX
AS OF JULY 27, 1991



Data computed by the Climate Analysis Center
Graphics by the NOAA/USDA Joint Agricultural Weather Facility

FIGURE 3. *This index is applicable as a general measure of the disruptive effects of prolonged dryness on water sensitive economics and reflects the long-term status of water supplies in aquifers, reservoirs, and streams. Areas of "severe" and "extreme" drought have expanded across the mid-Atlantic, southern northeast, central Appalachians, Ohio valley, Corn Belt, and south-central Plains during the last several weeks, increasing hydrological concerns.*